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FEDERAL COMMUICATIONS COMMISSION

47 CFR Parts 2 and 30

[ET Docket No. 21-286; FCC 23-114; FR ID 198341]

Modifying Emissions Limits for the 24.25-24.45 GHz and 24.75-25.25 GHz Bands

AGENCY: Federal Communications Commission.

ACTION: Proposed rule; solicitation of comment.

SUMMARY: In this document, the Federal Communications Commission (Commission) proposes to implement certain decisions regarding the 24.25-27.5 GHz band made in the World Radiocommunication Conference held by the International Telecommunication Union (ITU) in 2019 (WRC-19). Specifically, the Commission proposes to align part 30 of the Commission's rules for mobile operations with the Resolution 750 limits on unwanted emissions into the passive 23.6-24.0 GHz band that were adopted at WRC-19. These proposed rule changes would help to facilitate the protection of passive sensors used for weather forecasting and scientific research in the 23.6 GHz-24.0 GHz band, while continuing to promote flexible commercial use of the 24.25-24.45 GHz and 24.75-25.25 GHz bands (collectively, 24 GHz band). The Commission also seeks comment on alternatives to the proposals it makes, and on other related issues.

DATES: Comments are due on or before [INSERT DATE 30 DAYS AFTER DATE OF PUBLICATION IN THE *FEDERAL REGISTER*]; reply comments are due on or before [INSERT DATE 45 DAYS AFTER DATE OF PUBLICATION IN THE *FEDERAL REGISTER*]. Written comments on the Initial Regulatory Flexibility Analysis (IRFA) in this document must have a separate and distinct heading designating them as responses to the IRFA and must be submitted by the public on or before [INSERT DATE 30 DAYS AFTER DATE OF PUBLICATION IN THE *FEDERAL REGISTER*].

ADDRESSES: Pursuant to §§ 1.415 and 1.419 of the Commission's rules, 47 CFR 1.415, 1.419, interested parties may file comments and reply comments on or before the dates indicated on the first page of this document. Comments may be filed using the Commission's Electronic Comment Filing System (ECFS). *See* Electronic Filing of Documents in Rulemaking Proceedings, 63 FR 24121 (1998). You may submit comments, identified by ET Docket No. 21-186, by any of the following methods:

- *Electronic Filers*: Comments may be filed electronically using the Internet by accessing the ECFS: http://www.fcc.gov/ecfs/.
- *Paper Filers*: Parties who choose to file by paper must file an original and one copy of each filing.

  Filings can be sent by commercial overnight courier, or by first-class or overnight U.S. Postal Service mail. All filings must be addressed to the Commission's Secretary, Office of the Secretary, Federal Communications Commission.

  - Commercial overnight mail (other than U.S. Postal Service Express Mail and Priority Mail) must be sent to 9050 Junction Drive, Annapolis Junction, MD 20701.
  - U.S. Postal Service first-class, Express, and Priority mail must be addressed to 45 L Street NE Washington, DC 20554.
- Effective March 19, 2020, and until further notice, the Commission no longer accepts any hand or messenger delivered filings. This is a temporary measure taken to help protect the health and safety of individuals, and to mitigate the transmission of COVID-19. *See FCC Announces Closure of FCC Headquarters Open Window and Change in Hand-Delivery Policy*, *Public Notice*, 35 FCC Rcd 2788, 2788-89 (OS 2020), https://www.fcc.gov/document/fcc-closes-headquarters-open-window-and-changes-hand-delivery-policy.

People with Disabilities: To request materials in accessible formats for people with disabilities (braille, large print, computer diskettes, audio recordings), send an e-mail to fcc504@fcc.gov or call the Consumer & Governmental Affairs Bureau at 202-418-0530 (voice), 202-418-0432 (TTY).

FOR FURTHER INFORMATION CONTACT: Simon Banyai of the Wireless Telecommunications Bureau, Broadband Division, at 202-418-1443 or Simon.Banyai@fcc.gov.

SUPPLEMENTARY INFORMATION: This is a summary of the Commission's Notice of Proposed Rulemaking (*NPRM*), in ET Docket No. 21-186, FCC 23-114; adopted on December 12, 2023 and released on December 22, 2023. The full text of this document is available at https://docs.fcc.gov/public/attachments/FCC-23-114A1.pdf.

Regulatory Flexibility Act: The Regulatory Flexibility Act of 1980, as amended (RFA), requires that an agency prepare a regulatory flexibility analysis for notice-and-comment rulemaking proceedings, unless the agency certifies that "the rule will not, if promulgated, have a significant economic impact on a substantial number of small entities." The Commission seeks comment on potential rule and policy changes contained in the *NPRM*, and accordingly, has prepared an IRFA. The IRFA for this *NPRM* in ET Docket No. 21-286 is set forth below in this document and written public comments are requested. Comments must be filed by the deadlines for comments on the *NPRM* indicated under the DATES section of this document and must have a separate and distinct heading designating them as responses to the IRFA. The Commission reminds commenters to file in the appropriate docket: ET Docket No. 21-286.

Ex Parte Rules: The proceeding shall be treated as a "permit-but-disclose" proceeding in accordance with the Commission's *ex parte* rules. Persons making *ex parte* presentations must file a copy of any written presentation or a memorandum summarizing any oral presentation within two business days after the presentation (unless a different deadline applicable to the

Sunshine period applies). Persons making oral *ex parte* presentations are reminded that memoranda summarizing the presentation must (1) list all persons attending or otherwise participating in the meeting at which the *ex parte* presentation was made, and (2) summarize all data presented and arguments made during the presentation. If the presentation consisted in whole or in part of the presentation of data or arguments already reflected in the presenter's written comments, memoranda, or other filings in the proceeding, the presenter may provide citations to such data or arguments in his or her prior comments, memoranda, or other filings (specifying the relevant page and/or paragraph numbers where such data or arguments can be found) in lieu of summarizing them in the memorandum. Documents shown or given to Commission staff during *ex parte* meetings are deemed to be written *ex parte* presentations and must be filed consistent with rule 1.1206(b). In proceedings governed by rule 1.49(f) or for which the Commission has made available a method of electronic filing, written *ex parte* presentations and memoranda summarizing oral *ex parte* presentations, and all attachments thereto, must be filed through the electronic comment filing system available for that proceeding, and must be filed in their native format (e.g., .doc, .xml, .ppt, searchable .pdf). Participants in this proceeding should familiarize themselves with the Commission's *ex parte* rules.

Paperwork Reduction Act: This document does not contain proposed information collection requirements to the Paperwork Reduction Act of 1995, Public Law 104-13. Therefore, it does not contain any proposed information collection burden "for small business concerns with fewer than 25 employees," pursuant to the Small Business Paperwork Relief Act of 2002, Public Law 107-198, see 44 U.S.C. 3506(c)(4).

Synopsis

I. NOTICE OF PROPOSED RULEMAKING IN WT DOCKET NO. 21-186

A. Background

1. The 23.6-24.0 GHz band is allocated to the Earth Exploration Satellite Service (EESS) (passive), Space Research Service (passive), and Radio Astronomy Service (RAS) on a primary basis. EESS utilizes passive sensors located on satellites to measure the power level of naturally occurring radio emissions from water vapor and cloud liquid water molecules in the atmosphere, critical measurements for climatology science and weather forecasting. The National Oceanic and Atmospheric Administration (NOAA) uses such passive sensors to measure moisture data and determine water vapor in its weather forecast models. Because these naturally occurring emissions in the 23.6-24.0 GHz band are very weak, the passive sensors measuring them are sensitive and vulnerable to interference. As these sensors receive all natural and man-made emissions in general, passive sensors are not able to differentiate these two sources of signals.

2. The Commission first authorized service in the 24.25-24.45 GHz and 25.05-25.25 GHz bands in 1997, when it transitioned the Digital Electronic Messaging Service (DEMS) to these bands from the 18 GHz band. In 2000, the Commission adopted competitive bidding and service rules for these bands and created a 24 GHz Service. This 24 GHz Service had a total of 176 Economic Areas (EA) or EA-like service areas. In 2004, the Commission held Auction 56, in which it made 880 24 GHz licenses available. Only seven of the 880 licenses were sold. As of 2017, there were 33 active DEMS licenses in these bands.

3. In 2017, the Commission authorized the 24 GHz band for Upper Microwave Flexible Use Services (UMFUS), and generally applied the same licensing and technical rules to UMFUS in the 24 GHz band that it applied to UMFUS in other upper microwave bands. The UMFUS rules allow licensees flexibility as to the services they will deploy and the architecture of their networks. Under these rules, licensees are able to deploy mobile services, but they also

may implement fixed point-to-point and point-to-multipoint systems. Among other things, the UMFUS rules specify that emissions outside of a licensee's assigned frequency block must be limited to –13 dBm/MHz.[1] With respect to the passive systems operating in the 23.6-24 GHz band, the Commission noted that ongoing international studies included analyses to determine International Mobile Telecommunications (IMT) unwanted emissions limits necessary to protect passive sensors, and it acknowledged that the Commission's UMFUS rules might be revisited once these international studies had been completed.

4. WRC-19 allocated 24.25-25.25 GHz to mobile (except aeronautical) on a primary basis in Regions 1 and 2, globally identified the 24.25-27.5 GHz band for IMT, and established limits on unwanted emissions applicable to IMT in the 24.25-27.5 GHz band to protect EESS passive systems in the 23.6-24.0 GHz band from harmful interference. To protect EESS passive systems, WRC-19 modified a footnote to the International Table of Allocations to add a new limit contained in Resolution 750 (Rev. WRC-19). Resolution 750 specifies unwanted emissions limits in terms of Total Radiated Power (TRP) as the amount of power that may be radiated into any 200 megahertz block of the 23.6-24.0 GHz passive band by IMT base stations and IMT mobile stations operating in the 24.25-27.5 GHz band. Resolution 750 sets emissions limits for current IMT devices as well as more stringent emissions limits for IMT devices that will be brought into use in the 24.25-27.5 GHz band on or after September 1, 2027.[2] These two sets of unwanted emissions limits are shown in Table 1.

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[1] 47 CFR § 30.203(a). In the bands immediately outside and adjacent to the licensee's frequency block, having a bandwidth equal to 10 percent of the channel bandwidth, the conductive power or the total radiated power of any emission shall be −5 dBm/MHz or lower. As the 23.6-24 GHz passive band is 250 megahertz away from the UMFUS bands, the −5 dBm/MHz does not apply within that passive band for UMFUS licensees.

[2] For IMT base stations and mobile stations brought into use prior to September 1, 2027, the more relaxed unwanted emissions limits will continue to apply. ITU Radio Regulations (2020), Resolution 750 (Rev.WRC-19), Table 1, Vol. 3 at 519, 522.

Table 1: WRC-19 Resolution 750 Unwanted emissions permitted within any 200 megahertz in the 23.6-24 GHz passive band		
Type of Station	Current TRP Limits	TRP Limits After Sept. 1, 2027
IMT Base Stations	–33 dBW	–39 dBW
IMT Mobile Stations	–29 dBW	–35 dBW

5. On April 26, 2021, the Office of Engineering and Technology and the Wireless Telecommunications Bureau issued a *Public Notice* that sought to develop a record on whether and how the Commission could implement the emissions limits contained in Resolution 750 for the active services in the 24 GHz band.[3] The *Public Notice* specifically sought comment on the possibility of amending part 30 of the Commission's rules to conform to the unwanted emissions limits into the passive 23.6-24.0 GHz band that were adopted at WRC-19 and/or to add footnotes to the United States Table of Frequency Allocations at part 2 of the Commission's rules.

6. The *Public Notice* sought comment regarding what level of emissions could be expected within the 23.6-24.0 GHz band from UMFUS transmitters, and whether and to what extent new 5G deployments at the current UMFUS emissions limits could cause harmful interference to passive systems operating in the 23.6-24.0 GHz. It also asked how equipment intended for use under the UMFUS rules in the 24 GHz band could be reconfigured to conform to both the current and future Resolution 750 unwanted emissions limits. In addition, the *Public Notice* asked whether licensees could meet the Resolution 750 deadlines, as well as whether the Commission could help facilitate a more accelerated timeframe. It also inquired whether such emissions limits should be measured as conducted power or total radiated power.

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[3] *See Office of Engineering & Technology and the Wireless Telecommunications Bureau Seek Comment on Emission Limits for the 24.25-27.5 GHz Band, Public Notice,* 36 FCC Rcd 7561 (OET WTB 2021) (*Public Notice*).

7. The *Public Notice* also sought comment on the scope of operations that would be covered if the Commission were to adopt the emissions limits in Resolution 750 for the 24.25-27.5 GHz band. In particular, it sought comment on whether the Resolution 750 unwanted emissions limits should apply to (1) IMT mobile systems only, (2) all mobile systems, or (3) all systems, including fixed point-to-point and point-to-multipoint systems. As noted above, the unwanted emissions limits of Resolution 750 apply only to IMT base stations and mobile stations. IMT standards are not specific technologies, but rather specifications and requirements for high-speed mobile broadband service. The *Public Notice* noted that Resolution 750 specified TRP as the only means of measuring whether equipment met the required emissions limits. It asked if there are any difficulties in performing over the air TRP measurements at such low signal levels in the 24.25-24.45 GHz and 24.75-25.25 GHz bands and whether a conductive power methodology should be permitted as an alternative means of demonstrating compliance with the emissions limits for equipment certification.

8. Comments on the *Public Notice* were due June 26, 2021, and reply comments were due July 26, 2021. The Office of Engineering and Technology and Wireless Telecommunications Bureau received ten comments, and four reply comments.

II. DISCUSSION

A. Revision of Commission Rules to Adopt Resolution 750 Unwanted Emissions Limits

9. The Commission proposes to adopt the Resolution 750 unwanted emissions limits adopt WRC-19, to apply them to all mobile systems in the 24 GHz band, and to incorporate those limits into its part 30 technical rules as well as codifying them in a new U.S. footnote to the Table of Frequency Allocations (Allocation Table). Under this proposal, as of the effective date of the rules, mobile operations in the 24 GHz band would be required to comply with the current TRP limits adopted at WRC-19. The Commission seeks comment on

this proposal and on alternative limits, including the effect of any changes to existing limits on smaller entities. The Commission also seeks comment on the schedule for adoption of any revised limits, including adjustments that should be made for smaller entities to come into compliance. Appropriate out-of-band emissions limits in the 24.25-27.5 GHz band are important to protect passive sensing operations in the 23.6-24.0 GHz band, which are central to weather forecasting and scientific research.

10. Based on the record before the Commission, it appears that the proposed Resolution 750 unwanted emission limits likely strike the appropriate balance between protecting passive sensing and facilitating use of the 24 GHz band.[4] NTIA, AT&T, CTIA, Nokia, T-Mobile, Ericsson, Marcus & Jornet, and AGU/AMS/NWA support adopting these limits. They argue that adopting these limits would provide important protection to extremely sensitive passive satellite operations, would allow 5G to continue to develop and deploy in the U.S., would be consistent with U.S. policy as a signatory to the treaty of the text of the Radio Regulations, and would promote international harmonization. Moreover, NTIA asserts that adopting the rules would help to meet the Administration's goals for climate monitoring and climatological science, would enable the U.S. to maintain its position as a world leader in telecommunications, and would enable manufacturers to produce equipment marketable across the globe. The Commission asks parties that support adopting the Resolution 750 limits to quantify the benefits of these limits.

11. The Commission notes that, while equipment manufacturers support adopting the Resolution 750 limits, Qualcomm, in its comments to the *Public Notice*, opposes adopting

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[4] The Commission notes that, in 2017, the Commission provided notice that ongoing international studies included analyses to determine IMT-2020 OOBE limits necessary to protect passive sensors onboard weather satellites in the 23.6-24 GHz band, and that once the studies were completed, new rules might be necessary for protection of these operations. *In the Matter of Use of Spectrum Bands Above 24 GHz for Mobile Radio Servs.*, 32 FCC Rcd. 10988, 10997, para. 22 (2017).

these limits because it alleges that they will require equipment that uses the 24 GHz UMFUS band to operate with lower in-band power levels. The Commission seeks comment on Qualcomm's concerns. In particular, the Commission asks parties that argue that adoption of the Resolution 750 limits would increase network deployment costs to quantify these additional costs and to specify the impact on existing and future service. Commenters should separately discuss deployment costs associated with the current limits and limits recommended for implementation after Sept. 1, 2027.

12. The Commission proposes to adopt the limits set forth in Resolution 750. In doing so, the Commission also seeks comment on whether some changes to these limits may be appropriate to help strike the best balance and better serve the public interest in the United States while protecting EESS operations in the 23.6-24.0 GHz band. For example, CORF asserts that the WRC limits are not stringent enough to protect EESS operations, and it requests that the Commission should either adopt the European OOBE standard it offered going into WRC-19 (–42 dBW in 200 MHz)[5] or the World Meteorological Organization (WMO) proposal (–54 dBW in 200 MHz).[6] CORF also points out that although the primary focus of the *Public Notice* was protecting EESS, RAS also has a co-primary allocation at 23.6-24.0 GHz.

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[5] The Commission notes that after WRC-19, the European Union modified its stricter limits stating that "[t]he continued application of the current more stringent EU-harmonised protection limits in the single market would provide greater protection of the EESS (passive) across the territory of the Union. However the application of protection limits in the Union that differed from those applied in the rest of the world, in particular by being more stringent may affect the degree of equipment availability and choice, which in turn may have a negative impact on equipment costs and the scale of investments in high-capacity (5G) networks…" and concluded that "Decision (EU) 2019/784 should be amended in order to preserve the balance of Union policies on 5G deployment and the monitoring of the Earth's atmosphere and surface and to foster the Union's role as a leader in the global 5G ecosystem of equipment and services."). *See* EU Commission implementing Decision (EU) 2020/590 (24 April 2020) amending Decision (EU) 2019/784, at https://docdb.cept.org/download/167.

[6] IEEE neither supports nor rejects the WRC-19 limits but propose the alternative of supporting whichever limit allows for the least power to be emitted into the 23.6-24.0 GHz band. IEEE Comments at 4. IEEE also argues it is necessary to understand the filter roll-off characteristics of the equipment being used in order to calculate the amount of power that would be transmitted by that equipment into a 200 MHz block of the 23.6-24.0 GHz band, and therefore requests that the Commission delay making a decision on limits until the Commission has completed such an evaluation. *Id.* Assuming the Commission adopts rules that will limit the amount of unwanted emissions

13. AT&T, T-Mobile, and CTIA request that the Commission reject the more stringent limits suggested by CORF. AT&T argues that the stricter limits may hinder the roll-out and growth of 5G services. T-Mobile notes that the Resolution 750 limits from the ITU were carefully considered and are a product of extensive collaboration, and that CORF has not demonstrated why these limits are inadequate. CTIA argues that adopting CORF's proposal would conflict with the notice that it asserts was given to bidders in the 24 GHz auction that the Commission would not adopt limits that are significantly stricter than what was agreed to at WRC-19. The Commission seeks comment on CORF's proposal in the record. Parties supporting changes to the Resolution 750 unwanted emission limits should provide additional technical justification and explain why any stricter changes are necessary to protect EESS operations in the United States. While CORF also raises issues concerning RAS, the Commission notes that Resolution 750 was limited to protection of EESS, and RAS is outside the scope of this proceeding. The Commission also notes that RAS observations that are protected under US74 historically have received a lower level of protection than EESS.[7]

14. The Commission proposes to make any changes to the limits on emissions into the 23.6-24.0 GHz band by amending its part 30 rules and adding a footnote to the U.S. Table of Allocations. Since the Commission's part 30 rules already contain a rule governing emissions limits, it appears to be appropriate to incorporate any changes the Commission makes in this proceeding into that rule. CORF, CTIA, and T-Mobile all support incorporating any changes to

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into the EESS band, its licensees will be required to comply with those limits by any means necessary. Although the Commission invites commenters to provide information on filter roll-off characteristics, the Commission sees no need to delay this proceeding pending such information.

[7] *Compare* United States Table of Allocations, 47 CFR 2.106(c)(74) ("In the bands . . . 23.6-24.0 . . . GHz, the radio astronomy service shall be protected from unwanted emissions only to the extent that such radiation exceeds the level which would be present if the offending station were operating in compliance with the technical standards or criteria applicable to the service in which it operates.") *with id.* at (c)(246) ("No station shall be authorized to transmit in the following bands. . .").

the Commission's emissions limits into part 30 of the Commission's rules. The Commission seeks comment on alternative approaches.

B. Services Subject to Resolution 750 Unwanted Emissions Limits

15. The Commission proposes to apply the Resolution 750 unwanted emissions limits to all mobile operations (as defined in parts 2 and 20 of the Commission's rules)[8] in the 24 GHz band, not just to IMT operations. While WRC-19 only applied the unwanted emissions limits of Resolution 750 to IMT base stations and mobile stations, the Commission's rules do not define IMT and do not require that equipment complying with a particular technical standard be used in a band licensed under the UMFUS rules. Accordingly, attempting to treat non-IMT mobile operations differently than IMT mobile operations could cause confusion and difficulties with enforcing the limits. The Commission also does not see a technical justification for applying different emissions limits to IMT and non-IMT mobile systems. NTIA believes that device and deployment density, along with pointing angles toward the satellite, are the predominant factors in causing interference to the passive satellite sensors, and these factors are not unique to IMT but common to all mobile systems. Additionally, the Commission notes that NTIA, CORF, and various wireless industry commenters support applying any revised emissions limits to all mobile operations, while no commenter supports applying the Resolution 750 emissions limits to only IMT mobile operations.[9] The Commission seeks comment on this proposal. The Commission also seeks comment on NTIA's request that the Commission apply

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[8] *See* 47 CFR 2.1 ("Mobile Service. A radiocommunication service between mobile and land stations, or between mobile stations."); *see also* 47 CFR 20.3 ("Mobile Service. A radio communication service carried on between mobile stations or receivers and land stations, and by mobile stations communicating among themselves, and includes: (a) Both one-way and two-way radio communications services; (b) A mobile service which provides a regularly interacting group of base, mobile, portable, and associated control and relay stations (whether licensed on an individual, cooperative, or multiple basis) for private one-way or two-way land mobile radio communications by eligible users over designated areas of operation; and (c) Any service for which a license is required in a personal communications service under part 24 of this chapter.")

[9] Qualcomm opposes the WRC limits and asks the Commission to maintain the existing –13 dBm/MHz OOBE standard, but to the extent the Commission will adopt the WRC limits, it asks that they apply only to mobile deployments. Qualcomm Comments at 2.

the Resolution 750 unwanted emissions limits to fixed operations, including point-to-point and point-to-multipoint operations,[10] though the Commission acknowledges that WRC-19 did not study fixed deployments. NTIA argues the Commission should apply the two-phased WRC-19 emissions limit timetable described below to fixed deployments. It asserts that fixed services that cannot comply with the WRC-19 OOBE limits, or that cannot meet the phased approach, should be constructed to operate with no greater than 0 degree antenna up-tilt to protect satellite operations.[11] NTIA further submits that the applicability of OOBE limits to fixed deployments is an issue that could merit explicit study – perhaps jointly by the Commission and NTIA – to gain sufficient confidence to relax the rules for fixed services. CORF and IEEE also want all potential UMFUS operations, mobile and fixed, to be subject to enhanced OOBE standards.

16. The Commission seeks comment on whether it would be necessary to apply emissions limits stricter than –13 dBm/MHz to fixed operations in the 24 GHz band. Proponents of applying stricter limits as well as those arguing for maintaining the existing limits should provide specific technical data justifying their respective positions, as well as the costs and benefits of applying stricter limits or of keeping the existing limits.[12] The Commission notes that numerous point-to-point microwave links deployed by non-federal and federal operators in the 21.2-23.6 GHz band (which has propagation characteristics similar to the 24 GHz band and is immediately adjacent to the 23.6-24.0 GHz passive band) operate with the same unwanted emissions limits that apply under the UMFUS rules. The Commission seeks comment

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[10] Point-to-multipoint operations include transportable user equipment, where the user equipment is not intended to be used while in motion, but the equipment could be moved when not in operation. *See* 47 CFR 30.2.

[11] NTIA further submits that the applicability of OOBE limits to fixed deployments is an issue that could merit explicit study—perhaps jointly by the Commission and NTIA—to gain sufficient confidence to relax the rules for fixed services. NTIA Comments at 12.

[12] The Commission notes the arguments that the scientific community is unable to determine whether data has been corrupted by low-level interference. *See* CORF Comments at 13-14.

on whether these existing deployments have caused harmful interference to passive sensors in the 23.6-24.0 GHz band, and on the likelihood that the tighter beams of fixed point-to-point systems will be detected by passive instruments in space. The Commission also seeks comment on whether there are material differences between existing fixed point-to-point systems and fixed point-to-point and point-to-multipoint systems that may be deployed in the 24 GHz band in the future and how such systems might impact emissions into the 23.6-24.0 GHz band. Further, the Commission seeks comment on NTIA's alternative suggestions of limiting the elevation angles of fixed deployments.

17. Finally, the Commission seeks comment on Ericsson's and AT&T's proposal that indoor small-cell systems be exempt from the Resolution 750 limits. The Commission urges parties who support an exemption for indoor systems to include a technical justification for treating indoor small-cell systems differently. The Commission notes that indoor systems normally run at lower power and should have less difficulty meeting the Resolution 750 limits. Conversely, building attenuation would further reduce the likelihood of unwanted emissions in the 23.6-24 GHz passive band from indoor small cell transmitters.

C. Timetable for Application of WRC-19 Limits

18. The Commission proposes to apply the new Resolution 750 unwanted emissions limits on the timeframes adopted at WRC-19. Under this proposal, the first phase limits (–33 dBW for base stations, –29 dBW for mobile stations) would apply as of the effective date of the rules, and the second phase limits (–39 dBW for base stations, –35 dBW for mobile stations) would apply to all deployments after September 1, 2027. AT&T, CTIA, Ericsson, Nokia, and T-Mobile support adopting the WRC limits on the timeframes adopted by WRC-19. The Commission notes that no party has alleged that there will be a problem complying with the first phase limits or has asserted that existing deployments in the 24 GHz band would be constrained by such limits. AT&T, Ericsson, and Nokia state they will have equipment that

meets the interim Phase 1 standard, and that they are working on compliance with the 2027 standards, which will depend on advances in chipsets and significant research and development.[13] CTIA asserts that licensees and manufacturers have relied on the WRC-19 decisions in developing equipment and planning deployment, and it notes that the 3rd Generation Partnership Project (3GPP) standards development organization is adopting these limits into its standards for equipment operating in the band based on the timeframes determined at WRC-19. The Commission seeks comment on this proposal.

19. One of the tools that the Commission uses to ensure compliance with its technical rules is its equipment authorization program for RF devices, which is codified in part 2 of its rules. In general, and for 24 GHz band devices used for mobile services, RF devices must comply with the Commission's technical and equipment authorization requirements before they can be imported into or marketed in the United States.[14] Because the unwanted emission limits for base stations and mobile stations will change after September 1, 2027 under the Commission's proposal, equipment certifications based on compliance with the first phase limits would expire on that date. Any equipment remaining in the supply chain—i.e. in warehouses or in transit—would then be illegal to sell or install under the Commission's rules. To minimize this issue, the Commission seeks comment on whether the Commission should prohibit the grant of new equipment certifications for, or the importation of, equipment not complying with the phase two unwanted emission limits at a date prior to September 1, 2027.

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[13] Nokia states its equipment meets the current WRC limits and that it is devoting substantial resources to meet the stricter limits by, but not earlier than, September 1, 2027. Nokia Comments at 1-2. Likewise, Ericsson states it already designs its equipment to meet the current, phase 1 WRC-19 limits, but cannot guarantee meeting the stricter, phase 2 limits prior to September 2027. Ericsson Comments at 4. AT&T states its planning is designed to meet Phase 1, but Phase 2 is significantly more restrictive and will require research and development, arguing against accelerated deadlines. AT&T Reply Comments at 3-4.

[14] *See* 47 CFR 2.803, 30.201. Part 30 transmitters used for fixed point-to-point microwave and point-to-multipoint services do not require certification. *See also* 47 U.S.C. § 302a(b) (stating that no person shall manufacture, import, sell, offer for sale, or ship devices or home electronic equipment and systems, or use devices, which fail to comply with regulations promulgated under the Act).

For example, the Commission could cease granting new equipment certifications or permitting importation of equipment certified as complying with only the first phase limits after March 1, 2027—six months before the implementation of the second phase limits. Adopting such a rule could help prevent equipment that does not comply with the phase two unwanted emission limits from being deployed after September 1, 2027. The Commission would expect equipment manufacturers and distributors to manage their inventories to comply with the rules that the Commission adopts.

20. IEEE asks that the U.S. apply the stricter Phase 2 standards on an accelerated schedule for new deployments and in 2027 for all deployments, consistent with the European Union. The Commission seeks comment on the feasibility and appropriateness of accelerating the deadline for compliance with the Phase 2 standards. In that regard, the Commission requests that equipment manufacturers and 24 GHz licensees provide further information on timelines for mobile equipment availability and system deployment. As noted above, while equipment manufacturers are working on equipment that would comply with the Phase 2 standards, it is not clear that equipment meeting the Phase 2 standards would be widely available on an accelerated time frame. Furthermore, the Phase 2 standards anticipate ubiquitous deployment of mobile systems in the band, and it is not clear that widespread deployment of mobile systems will occur in the band before 2027. The Commission also notes that licensees in the band in the U.S. will not be required to demonstrate buildout before 2029.

21. NTIA requests that the Commission incentivize early adoption of the 2027 WRC limits, asserting that the WRC limits are based on estimates of gradual 5G deployment, which is at odds with the United States' national priority of rapid 5G deployment. Noting that rapid 5G deployment in a range of frequency bands covering high-band, mid-band, and low-band spectrum is a priority for many countries around the world, and that international 5G deployments are well underway, the Commission seeks comment on NTIA's request. What

incentives would facilitate deployment of equipment that meets the Phase 2 limits? Are there steps the Commission can take to encourage the development and deployment of equipment that meets the Phase 2 standards?

22. NTIA urges, and AGU/AMS/NWA agrees, that base stations and user equipment modified or replaced after September 1, 2027, should comply with the post-2027 (e.g., –39 dBW) OOBE levels. CTIA argues this requirement is overly broad and would effectively prevent licensees from making any changes to existing deployments without purchasing and installing entirely new equipment; furthermore, it asserts the WRC-19 decision makes clear that the more stringent limits apply to equipment brought into use after September 2027, and that equipment brought into use before that date will continue to be subject to the initial emissions limits. T-Mobile notes that equipment can be "modified" in a number of insignificant ways, and thus, the Commission should only treat base station modifications that affect the emissions characteristics as "modifications." In contrast, AGU/AMS/NWA recommends that all legacy equipment installed prior to 2027 that does not meet the more stringent limits should be given a sunset date of September 1, 2028, for retrofit or replacement to comply with the Phase 2 limits. CTIA and AT&T respond that the Commission should not apply a more stringent emissions limit to any equipment that is modified or replaced after September 2027.

23. The Commission seeks comment on adopting a timetable that matches what was adopted at WRC-19; i.e., deployments would be required to meet the first phase limits as of the effective date of any rules the Commission adopts, and deployments after September 1, 2027 would be required to meet the stricter second phase limits. The Commission notes the concern that significant research and development will be required to meet the 2027 deadline in the U.S. The Commission seeks comment on rules for transitioning equipment deployed under the Phase 1 limits, including the proposal of NTIA and others that parties modifying or replacing equipment after September 1, 2027 must meet the more stringent OOBE limit (e.g., –39 dBW).

The Commission seeks to understand what would constitute "replacement" or "modification" of equipment under such a proposal. What sort of technical changes would constitute a "modification" for this purpose? Would any alterations qualify, or only those which altered certain technical parameters, such as antenna height? To the extent that parties are correct that the U.S. would be better served by having its equipment ecosystem meet stricter emissions limits by 2024 as is required in Europe,[15] the Commission seeks comment on whether there are any steps it can take to facilitate early adoption of the 2027 limit. Additionally, as noted above, the Commission seeks comment on whether a different implementation schedule would be appropriate for smaller entities and if so, what would be the related costs and benefits.

D. Measurement of Unwanted Emissions

24. Currently, the UMFUS rules permit equipment manufacturers the flexibility of demonstrating compliance with the out-of-band emissions limits by using either a TRP or conductive methodology when obtaining equipment certification. To the extent that the Commission adopts new emissions limits to protect passive sensors in the 23.6-24.0 GHz band, the Commission proposes to allow compliance with the unwanted emissions limits for the 23.6-24.0 GHz band to be demonstrated using TRP measurements, and the Commission seeks comment on whether to permit use of conductive power measurements as well.

25. CTIA, Nokia, and AT&T support the Commission permitting use of either TRP or conductive power methodologies to measure emissions, while NTIA, AGU/AMS/NWA, and Ericsson argue that only TRP should be allowed, consistent with the rules adopted at WRC-19. CTIA urges the Commission to allow for measurement of emissions either in terms of TRP or

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[15] In Europe, the initial focus on licensing has been the 26.5-27.5 GHz band. *See*, *e.g.*, *Global update on spectrum for 4G & 5G*, Qualcomm Corporation, December 2020, available at https://www.qualcomm.com/media/documents/files/spectrum-for-4g-and-5g.pdf at 11.

conductive power to provide manufacturers the flexibility to determine the most feasible approach for a particular device without affecting compliance with the established limits. Other commenters assert that the Commission should not permit the conductive power methodology to be used to measure emissions into the 23.6-24.0 GHz band. NTIA suggests that only TRP measurements should be permitted because the Resolution 750 unwanted emissions limits are based on the use of TRP and because conductive power, while useful, is presently less understood than TRP. Ericsson adds that mobile terrestrial systems are increasingly relying on large arrays of active antenna elements in their design, and there are no physical connections to the antenna elements, making conductive power measurements unnecessary. Ericsson does not anticipate encountering any difficulties in performing TRP measurements on low signal levels in the 24.25-24.45 GHz and 24.75-25.25 GHz bands in a controlled chamber environment, such as anechoic chambers, where reliable and repeatable power measurements can be taken at discrete sets of points from all directions from the antenna. AGU/AMS/NWA recognize Ericsson's support for TRP and state that permitting multiple measurement techniques would make it difficult for the scientific community to use the measurement data from licensees to determine if those emissions may be detrimental to passive sensing measurements.

26. The Commission notes that no party objects to including TRP measurements as an acceptable alternative. As the Commission stated in the Spectrum Frontiers proceeding, however, a TRP measurement of a device requires that EIRP measurements be made around a spherical surface surrounding the device for both polarizations, and as a result it can be time consuming and difficult.[16] Given the complexity of making TRP measurements, the Commission

[16] *See Use of Spectrum Bands Above 24 GHz For Mobile Radio Services, et al*., GN Docket No. 14-177, IB Docket Nos. 15-256 and 97-95, RM-11664, WT Docket No. 10-112, Report and Order and Further Notice of Proposed Rulemaking, 31 FCC Rcd 8014, 8120, para. 303 (2016) (*Spectrum Frontiers 1st R&O*); Tadahiro Watanabe et al., *Total Radiated Power Measurement above 1 GHz with Partially-Spherical Scanning of a Probe*, 2009 Proceedings of the

seeks comment on whether allowing equipment manufacturers to use conductive power or other measurement alternatives will result in the increased potential for harmful interference to occur to 23.6-24.0 GHz band passive sensors. The Commission also seeks comment on whether equipment with accessible connections to make conductive power measurements has been manufactured or will likely be manufactured for use in this band. To the extent that commenters advocate against use of conductive power methodology for measuring unwanted emissions into the 23.6-24.0 GHz band, the Commission seeks comment on how to distinguish its disallowance in this band from generally accepted use domestically and internationally in other bands.[17]

E. Other Matters

27. Marcus & Jornet support adopting the WRC limits but ask the Commission to consider alternative antenna technologies or standards that they believe would protect passive sensing. For example, they urge the Commission to entertain waiver requests for alternative antenna technologies that demonstrate that the resulting emissions will protect the passive satellites to the limits stated in Recommendation ITU-R RS.2017-0. The Commission will consider waiver requests in accordance with its normal practice if a specific request is filed, and in light of the specific circumstances, and does not see the need to seek comment on such requests here.

Institute of Electronics, Information and Communication Engineers at 179 (http://www.ieice.org/proceedings/EMC09/pdf/21R3-3.pdf). As Ericsson has pointed out, this requires measurements to be made in a controlled environment, such as an anechoic or reverberation chamber. Ericsson Comments at 3-4.

[17] Resolution 750 specifies that the unwanted emissions for all other bands except for 23.6-24.0 GHz should be measured at the antenna port—i.e., they are conductive power limits. ITU Radio Regulations (2020), Resolution 750 (Rev.WRC-19), Table 1, Table 2 Vol. 3 at 519-524 https://www.itu.int/en/myitu/Publications/2020/09/02/14/23/Radio-Regulations-2020. The Commission's rules have traditionally specified out-of-band emissions limits in terms of conductive power and only permit TRP as an option in the UMFUS rules, which were adopted in 2016 and which also specify a conductive limit. 47 CFR § 30.203(a); *Spectrum Frontiers 1st R&O*, 31 FCC Rcd at 8119-21, paras. 301-304.

28. Meanwhile, Choyu Networks offers a proposal for Real-time Geospatial Spectrum Sharing (RGSS) as a method to ensure the protection of EESS radiometers from interference while enabling adjacent and coincident radio frequency spectrum to be used for 5G/6G (or alternative) communication networks. While the concept has potential interest, Choyu Networks admits that further research would be necessary to develop even a proof of concept RGSS system. Accordingly, it would appear to be premature to develop proposed rules based on an RGSS system at this time, but the Commission seeks comment on this alternative proposal.

F. Digital Equity and Inclusion

29. Finally, the Commission, as part of its continuing effort to advance digital equity for all, including people of color, persons with disabilities, persons who live in rural or Tribal areas, and others who are or have been historically underserved, marginalized, or adversely affected by persistent poverty or inequality, invites comment on any equity-related considerations[18] and benefits (if any) that may be associated with the proposals and issues discussed herein. Specifically, the Commission seeks comment on how its proposals may promote or inhibit advances in diversity, equity, inclusion, and accessibility, as well the scope of the Commission's relevant legal authority.

III. INITIAL REGULATORY FLEXIBILITY ANALYSIS

30. As required by the Regulatory Flexibility Act of 1980, as amended (RFA), the Commission has prepared this Initial Regulatory Flexibility Analysis (IRFA) of the possible

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[18] The term "equity" is used here consistent with Executive Order 13985 as the consistent and systematic fair, just, and impartial treatment of all individuals, including individuals who belong to underserved communities that have been denied such treatment, such as Black, Latino, and Indigenous and Native American persons, Asian Americans and Pacific Islanders and other persons of color; members of religious minorities; lesbian, gay, bisexual, transgender, and queer (LGBTQ+) persons; persons with disabilities; persons who live in rural areas; and persons otherwise adversely affected by persistent poverty or inequality. *See* Exec. Order No. 13985, 86 Fed. Reg. 7009, Executive Order on Advancing Racial Equity and Support for Underserved Communities Through the Federal Government (January 20, 2021).

significant economic impact on a substantial number of small entities by the policies and rules proposed in this *NPRM*. Written public comments are requested on this IRFA. Comments must be identified as responses to the IRFA and must be filed by the deadlines specified in the *NPRM* for comments. The Commission will send a copy of the *NPRM*, including this IRFA, to the Chief Counsel for Advocacy of the Small Business Administration (SBA). In addition, the *NPRM* and IRFA (or summaries thereof) will be published in the Federal Register.

A. Need for, and Objectives of, the Proposed Rules

31. In the *NPRM*, the Commission proposes to implement certain decisions regarding the 24.25-27.5 GHz band made in the World Radiocommunication Conference held by the International Telecommunication Union (ITU) in 2019 (WRC-19). Specifically, the Commission proposes to adopt the Resolution 750 limits, apply them to all mobile systems, and incorporate those limits into its part 30 technical rules. The Commission also proposes to adopt the WRC-19 timeframes for the Resolution 750 emissions limits. Resolution 750 defines current unwanted emissions limits, measured in terms of Total Radiated Power (TRP), for IMT base and mobile stations and a stricter set of emissions limits for the same stations that will become effective after September 1, 2027. Consistent with Resolution 750, the Commission proposes to adopt the use of TRP to measure compliance with the unwanted emissions limits for the 23.6-24.0 GHz band. The Commission seeks comment on these proposals and invites comment on alternative proposals and approaches such as applying Resolution 750 limits to fixed operations or applying them on a more abbreviated timeframe, adopting stricter emissions limits, and permitting the use of conductive power to measure compliance with the unwanted emissions limits. The Commission also seeks comment on equipment manufacturers' capacity to meet the proposed timelines, and whether adoption of the Resolution 750 emissions limits would increase network deployment costs with the directive to commenters to quantify any additional costs that would be incurred and discuss what if any impact there would be on

service. By adopting certain requirements consistent Resolution 750 and aligning them with part 30 of the Commission's rules, the Commission hopes to ensure the protection of Earth Exploration Satellite Service (EESS) passive operations in the 23.6-24.0 GHz band, which are critical for accurate climate monitoring and weather forecasting as well as for climatology science.

B. Legal Basis

32. The proposed action is authorized pursuant to sections 4(i), 301, 302, 303(r), 308, 309, and 333 of the Communications Act of 1934, 47 U.S.C. 154(i), 301, 302a, 303(r), 308, 309, 333.

C. Description and Estimate of the Number of Small Entities To Which the Proposed Rules Will Apply

33. The RFA directs agencies to provide a description of, and, where feasible, an estimate of the number of small entities that may be affected by the proposed rules and policies, if adopted. The RFA generally defines the term "small entity" as having the same meaning as the terms "small business," "small organization," and "small governmental jurisdiction." In addition, the term "small business" has the same meaning as the term "small business concern" under the Small Business Act. A "small business concern" is one which: (1) is independently owned and operated; (2) is not dominant in its field of operation; and (3) satisfies any additional criteria established by the SBA.

34. *Small Businesses, Small Organizations, Small Governmental Jurisdictions.* The Commission's actions, over time, may affect small entities that are not easily categorized at present. The Commission therefore describes here, at the outset, three broad groups of small entities that could be directly affected herein. First, while there are industry specific size standards for small businesses that are used in the regulatory flexibility analysis, according to data from the SBA's Office of Advocacy, in general a small business is an independent business

having fewer than 500 employees. These types of small businesses represent 99.9% of all businesses in the United States which translates to 30.7 million businesses.

35. Next, the type of small entity described as a "small organization" is generally "any not-for-profit enterprise which is independently owned and operated and is not dominant in its field." The Internal Revenue Service (IRS) uses a revenue benchmark of $50,000 or less to delineate its annual electronic filing requirements for small exempt organizations. Nationwide, for tax year 2018, there were approximately 571,709 small exempt organizations in the U.S. reporting revenues of $50,000 or less according to the registration and tax data for exempt organizations available from the IRS.

36. Finally, the small entity described as a "small governmental jurisdiction" is defined generally as "governments of cities, counties, towns, townships, villages, school districts, or special districts, with a population of less than fifty thousand." U.S. Census Bureau data from the 2017 Census of Governments indicate that there were 90,075 local governmental jurisdictions consisting of general purpose governments and special purpose governments in the United States. Of this number there were 36,931 general purpose governments (county, municipal and town or township) with populations of less than 50,000 and 12,040 special purpose governments - independent school districts with enrollment populations of less than 50,000. Accordingly, based on the 2017 U.S. Census of Governments data, the Commission estimates that at least 48,971 entities fall into the category of "small governmental jurisdictions."

37. *Wireless Telecommunications Carriers (except Satellite).* This industry comprises establishments engaged in operating and maintaining switching and transmission facilities to provide communications via the airwaves. Establishments in this industry have spectrum licenses and provide services using that spectrum, such as cellular services, paging services, wireless internet access, and wireless video services. The appropriate size standard under SBA

rules is that such a business is small if it has 1,500 or fewer employees. For this industry, U.S. Census Bureau data for 2012 show that there were 967 firms that operated for the entire year. Of this total, 955 firms had employment of 999 or fewer employees and 12 firms had employment of 1,000 employees or more. Thus under this category and the associated size standard, the Commission estimates that the majority of wireless telecommunications carriers (except satellite) are small entities.

38. *Fixed Microwave Services.* Microwave services include common carrier, private-operational fixed, and broadcast auxiliary radio services. They also include the Upper Microwave Flexible Use Service, the Millimeter Wave Service, and the Local Multipoint Distribution Service (LMDS), where licensees can choose between common carrier and non-common carrier status. The Commission has not yet defined a small business with respect to microwave services. The closest applicable SBA category is Wireless Telecommunications Carriers (except Satellite) and the appropriate size standard for this category under SBA rules is that such a business is small if it has 1,500 or fewer employees. For this industry, U.S. Census Bureau data for 2012 shows that there were 967 firms that operated for the entire year. Of this total, 955 had employment of 999 or fewer, and 12 firms had employment of 1,000 employees or more. Thus under this SBA category and the associated standard, the Commission estimates that the majority of fixed microwave service licensees can be considered small.

39. *Satellite Telecommunications.* This category comprises firms "primarily engaged in providing telecommunications services to other establishments in the telecommunications and broadcasting industries by forwarding and receiving communications signals via a system of satellites or reselling satellite telecommunications." Satellite telecommunications service providers include satellite and earth station operators. The category has a small business size standard of $35 million or less in average annual receipts, under SBA rules. For this category, U.S. Census Bureau data for 2012 show that there were a total of 275 firms that operated for

the entire year. Of this total, 299 firms had annual receipts of less than $25 million. Consequently, the Commission estimates that the majority of satellite telecommunications providers are small entities.

40. *All Other Telecommunications.* The "All Other Telecommunications" category is comprised of establishments primarily engaged in providing specialized telecommunications services, such as satellite tracking, communications telemetry, and radar station operation. This industry also includes establishments primarily engaged in providing satellite terminal stations and associated facilities connected with one or more terrestrial systems and capable of transmitting telecommunications to, and receiving telecommunications from, satellite systems. Establishments providing Internet services or voice over Internet protocol (VoIP) services via client-supplied telecommunications connections are also included in this industry." The SBA has developed a small business size standard for "All Other Telecommunications," which consists of all such firms with annual receipts of $35 million or less. For this category, U.S. Census Bureau data for 2012 show that there were a total of 1,442 firms that operated for the entire year. Of these firms, a total of 1,400 firms had annual receipts of less than $25 million and 15 firms had gross annual receipts of $25 million to $49,999,999. Thus, the Commission estimates that a majority of "All Other Telecommunications" firms potentially affected by its actions can be considered small.

41. *Radio and Television Broadcasting and Wireless Communications Equipment Manufacturing.* This industry comprises establishments primarily engaged in manufacturing radio and television broadcast and wireless communications equipment. Examples of products made by these establishments are: transmitting and receiving antennas, cable television equipment, GPS equipment, pagers, cellular phones, mobile communications equipment, and radio and television studio and broadcasting equipment." The SBA has established a small business size standard for this industry of 1,250 employees or less. U.S. Census Bureau data for

2012 show that 841 firms operated in this industry in that year. Of that number, 828 establishments operated with fewer than 1,000 employees, 7 establishments operated with between 1,000 and 2,499 employees and 6 establishments operated with 2,500 or more employees. Based on this data, the Commission concludes that a majority of manufacturers in this industry is small.

D. Description of Projected Reporting, Recordkeeping, and Other Compliance Requirements for Small Entities

42. The proposal in the *NPRM* to adopt the Resolution 750 emissions limits, emissions limits measurement methodology and emissions limits effective date timetables will not impose any new reporting or recordkeeping requirements. In assessing the cost of compliance for small entities, at this time the Commission is not in a position to determine whether, if adopted, the proposals in the *NPRM* will require small entities to hire professionals to comply, and cannot quantify the cost of compliance with any of the potential rule changes that may be adopted. Comments in response to the *Public Notice* that sought to develop a record on how the Commission should implement the emissions limits contained in Resolution 750 for the active services in the 24 GHz band that raised concerns about increased costs if Resolution 750 emissions limits are adopted, have been taken into consideration, and commenters have been asked to quantify these costs and specify the impact on service in the *NPRM*. The Commission expects the comments the Commission receives on its proposals to include information addressing costs, service impacts, and other matters of concern, which should help the Commission identify and evaluate relevant issues for small entities including compliance costs and other burdens that may result from the matters raised in the *NPRM*, before adopting final rules.

E. Steps Taken to Minimize the Significant Economic Impact on Small Entities, and Significant Alternatives Considered

43. The RFA requires an agency to describe any significant, specifically small business, alternatives that it has considered in reaching its proposed approach, which may include the following four alternatives (among others): (1) the establishment of differing compliance or reporting requirements or timetables that take into account the resources available to small entities; (2) the clarification, consolidation, or simplification of compliance or reporting requirements under the rule for such small entities; (3) the use of performance, rather than design, standards; and (4) an exemption from coverage of the rule, or any part thereof, for such small entities.

44. Having data on the costs and economic impact of the proposals and approaches discussed in the *NPRM* will allow the Commission to better evaluate options and alternatives for minimization, should there be a significant economic impact on small entities if Resolution 750 emissions limits and effective date timetables are adopted. Accordingly, the Commission expects to more fully consider the economic impact on small entities following its review of comments filed in response to the *NPRM* which as mentioned above in Section D includes a request for comments on the costs and service impacts associated with adoption of Resolution 750 emissions limits. Below the Commission discusses actions taken and alternatives considered by the Commission relating to the proposals in the *NPRM*.

45. Based on the record from the *Public Notice* comments, the Commission's proposal to adopt Resolution 750 emissions limits seems to strike the appropriate balance between protecting passive sensing satellite operations and facilitating use of the 24 GHz band. The Commission could have developed and proposed its own emission limits and related requirements which may have included emissions limits that were stricter or not as strict as the Resolution 750 emissions limits. The Commission could have also simply maintained the

existing rules. As discussed in the *NPRM* however, many of the industry participants support adoption of Resolution 750 emission limits to protect extremely sensitive passive satellite operations, facilitate the continued development and deployment of 5G in the U.S., promote international harmonization, enable equipment manufacturers to provide globally marketable equipment, and to be consistent with U.S. policy relating to Radio Regulations. Thus, the synchronicity between the Resolution 750 emissions limits and the Commission's part 30 rules appears to be the best course of action, although small entities that hold licenses subject to these rules may incur increased deployment costs to comply with the more stringent Resolution 750 emissions limits.

46. In the alternative, if the Commission were to propose and adopt its own emissions limits, particularly if the emissions limits were stricter than both the existing emission limits and Resolution 750 emission limits, small entities could be subjected to significantly increased compliance costs without any of the above-mentioned benefits. Further, if the Commission were to propose and adopt less stringent emissions limit requirements or if the Commission simply maintained the existing requirements, the Commission's rules may not provide the necessary protections for passive satellite operations to operate in the 24GHz band and might make it difficult for EESS to make observations free from harmful interference, thereby jeopardizing the accuracy of critical weather forecasting and climatology science data. Instead, the Commission believes its proposal to adopt the Resolution 750 emission limits which were carefully considered and the product of extensive industry collaboration, is the right approach and any potential burdens are outweighed by the benefits of protecting passive observations in the 23.6-24.0 GHz band, including improvements in weather forecasting.

47. Finally, in addition to seeking comment on the costs and service impacts of the Commission's proposals, the *NPRM* provides small entities the opportunity to submit comments on a wide range of issues relating to the proposed emissions limits including but not

limited to comment on alternative limits, including the effect that any changes to existing limits would have on smaller entities, comment on the schedule for adoption of any revised limits, including adjustments that should be made for smaller entities to come into compliance, and comment on other related matters that are not addressed in Resolution 750. The Commission's evaluation of the information it receives will shape the final alternatives it considers, the final conclusions it reaches, and any additional steps it takes to minimize any significant economic impact that may occur on small entities as a result of the final rules it promulgates in this proceeding.

F. Federal Rules that May Duplicate, Overlap, or Conflict with the Proposed Rules.

48. None.

IV. ORDERING CLAUSES

49. Accordingly, IT IS ORDERED, pursuant to sections 4(i), 301, 302, 303(r), 308, 309, and 333 of the Communications Act of 1934, 47 U.S.C. 154(i), 301, 302a, 303(r), 308, 309, 333, that this Notice of Proposed Rulemaking is HEREBY ADOPTED and is EFFECTIVE upon publication in the *Federal Register*. IT IS FURTHER ORDERED that the Commission's Office of Managing Director, Reference Information Center, SHALL SEND a copy of this Notice of Proposed

Rulemaking, including the Initial Regulatory Flexibility Analysis, to the Chief Counsel for Advocacy of the Small Business Administration.

List of Subjects

47 CFR Part 2

Common carriers

47 CFR Part 30

Communications common carriers

Federal Communications Commission

Marlene Dortch,

Secretary.

Office of the Secretary.

Proposed Rules

For the reasons discussed in the preamble, the Federal Communications Commission proposes to amend 47 CFR parts 2 and 30 as follows:

PART 2 – FREQUENCY ALLOCATIONS AND RADIO TREATY MATTERS; GENERAL RULES AND REGULATIONS

1. The authority citation for part 2 continues to read as follows:

Authority: 47 U.S.C. 154, 302a, 303, and 336, unless otherwise noted.

2. Amend § 2.106 by revising paragraph (a) pages 54 and 55 in the Table of Frequency Allocations and adding paragraph (c)(146) to read as follows:

§ 2.106 Table of Frequency Allocations.

(a) * * *

22-22.21 FIXED MOBILE except aeronautical mobile 5.149			22-22.21 FIXED MOBILE except aeronautical mobile US342		
22.21-22.5 EARTH EXPLORATION-SATELLITE (passive) FIXED MOBILE except aeronautical mobile RADIO ASTRONOMY SPACE RESEARCH (passive) 5.149 5.532			22.21-22.5 EARTH EXPLORATION-SATELLITE (passive) FIXED MOBILE except aeronautical mobile RADIO ASTRONOMY SPACE RESEARCH (passive) US342 US532		
22.5-22.55 FIXED MOBILE			22.5-22.55 FIXED MOBILE US211		
22.55-23.15 FIXED INTER-SATELLITE 5.338A MOBILE SPACE RESEARCH (Earth-to-space) 5.532A 5.149			22.55-23.15 FIXED INTER-SATELLITE US145 US278 MOBILE SPACE RESEARCH (Earth-to-space) 5.532A US342		Satellite Communications (25) Fixed Microwave (101)
23.15-23.55 FIXED INTER-SATELLITE 5.338A MOBILE			23.15-23.55 FIXED INTER-SATELLITE US145 US278 MOBILE		
23.55-23.6 FIXED MOBILE			23.55-23.6 FIXED MOBILE		Fixed Microwave (101)
23.6-24 EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive) 5.340			23.6-24 EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY US74 SPACE RESEARCH (passive) US246		
24-24.05 AMATEUR AMATEUR-SATELLITE 5.150			24-24.05 5.150 US211	24-24.05 AMATEUR AMATEUR-SATELLITE 5.150 US211	ISM Equipment (18) Amateur Radio (97)
24.05-24.25 RADIOLOCATION Amateur Earth exploration-satellite (active) 5.150			24.05-24.25 RADIOLOCATION G59 Earth exploration-satellite (active) 5.150	24.05-24.25 Amateur Earth exploration-satellite (active) Radiolocation 5.150	RF Devices (15) ISM Equipment (18) Private Land Mobile (90) Amateur Radio (97)
24.25-24.45 FIXED MOBILE except aeronautical mobile 5.338A 5.532AB	24.25-24.45 FIXED 5.532AA MOBILE except aeronautical mobile 5.338A 5.532AB RADIONAVIGATION	24.25-24.45 FIXED MOBILE 5.338A 5.532AB RADIONAVIGATION	24.25-24.45	24.25-24.45 FIXED MOBILE USxxx	RF Devices (15) Upper Microwave Flexible Use (30)

International Table			United States Table		FCC Rule Part(s)
Region 1 Table	Region 2 Table	Region 3 Table	Federal Table	Non-Federal Table	
24.45-24.65 FIXED INTER-SATELLITE MOBILE except aeronautical mobile 5.338A 5.532AB	24.45-24.65 FIXED 5.532AA INTER-SATELLITE MOBILE except aeronautical mobile 5.338A 5.532AB RADIONAVIGATION 5.533	24.45-24.65 FIXED INTER-SATELLITE MOBILE 5.338A 5.532AB RADIONAVIGATION 5.533	24.45-24.65 INTER-SATELLITE RADIONAVIGATION 5.533		RF Devices (15) Satellite Communications (25)
24.65-24.75 FIXED FIXED-SATELLITE (Earth-to-space) 5.532B INTER-SATELLITE MOBILE except aeronautical mobile 5.338A 5.532AB	24.65-24.75 FIXED 5.532AA INTER-SATELLITE MOBILE except aeronautical mobile 5.338A 5.532AB RADIOLOCATION-SATELLITE (Earth-to-space)	24.65-24.75 FIXED FIXED-SATELLITE (Earth-to-space) 5.532B INTER-SATELLITE MOBILE 5.338A 5.532AB	24.65-24.75 INTER-SATELLITE RADIOLOCATION-SATELLITE (Earth-to-space)		
24.75-25.25 FIXED FIXED-SATELLITE (Earth-to-space) 5.532B MOBILE except aeronautical mobile 5.338A 5.532AB	24.75-25.25 FIXED 5.532AA FIXED-SATELLITE (Earth-to-space) 5.535 MOBILE except aeronautical mobile 5.338A 5.532AB	24.75-25.25 FIXED FIXED-SATELLITE (Earth-to-space) 5.535 MOBILE 5.338A 5.532AB	24.75-25.25	24.75-25.25 FIXED FIXED-SATELLITE (Earth-to-space) MOBILE USxxx NG65	RF Devices (15) Satellite Communications (25) Upper Microwave Flexible Use (30)
25.25-25.5 FIXED 5.534A INTER-SATELLITE 5.536 MOBILE 5.338A 5.532AB Standard frequency and time signal-satellite (Earth-to-space)			25.25-25.5 FIXED INTER-SATELLITE 5.536 MOBILE USxxx Standard frequency and time signal-satellite (Earth-to-space)	25.25-25.5 Inter-satellite 5.536 Standard frequency and time signal-satellite (Earth-to-space)	RF Devices (15)
25.5-27 EARTH EXPLORATION-SATELLITE (space-to-Earth) 5.536B FIXED 5.534A INTER-SATELLITE 5.536 MOBILE 5.338A 5.532AB SPACE RESEARCH (space-to-Earth) 5.536C Standard frequency and time signal-satellite (Earth-to-space) 5.536A			25.5-27 EARTH EXPLORATION-SATELLITE (space-to-Earth) FIXED INTER-SATELLITE 5.536 MOBILE USxxx SPACE RESEARCH (space-to-Earth) Standard frequency and time signal-satellite (Earth-to-space) 5.536A US258	25.5-27 SPACE RESEARCH (space-to-Earth) Inter-satellite 5.536 Standard frequency and time signal-satellite (Earth-to-space) 5.536A US258	
27-27.5 FIXED INTER-SATELLITE 5.536 MOBILE 5.338A 5.532AB	27-27.5 FIXED 5.534A FIXED-SATELLITE (Earth-to-space) INTER-SATELLITE 5.536 5.537 MOBILE 5.338A 5.532AB		27-27.5 FIXED INTER-SATELLITE 5.536 MOBILE USxxx	27-27.5 Inter-satellite 5.536	
27.5-28.5 FIXED 5.537A FIXED-SATELLITE (Earth-to-space) 5.484A 5.516B 5.517A 5.539 MOBILE 5.538 5.540			27.5-30	27.5-28.35 FIXED FIXED-SATELLITE (Earth-to-space) MOBILE	RF Devices (15) Satellite Communications (25) Upper Microwave Flexible Use (30) Fixed Microwave (101)
				28.35-29.1 FIXED-SATELLITE (Earth-to-space) G165 NG527A	RF Devices (15) Satellite Communications (25)

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(c) * * *

(146) USxxx In the bands 24.25-24.45 GHz and 24.75-27.5 GHz, the total radiated power (TRP) of emissions from stations in the mobile service in any 200 MHz of the band 23.6-24 GHz shall not exceed -33 dBW/200 MHz for base stations and -29 dBW/200 MHz for mobile stations, and for stations brought into use after September 1, 2027, TRP shall not exceed -39 dBW/200 MHz for base stations and -35 dBW/200 MHz for mobile stations.

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PART 30 – UPPER MICROWAVE FLEXIBLE USE SERVICE.

3. The authority citation for part 30 continues to read as follows:

Authority: 47 U.S.C. 151, 152, 153, 154, 301, 303, 304, 307, 309, 310, 316, 332, 1302, unless otherwise noted.

4. Amend § 30.203 by adding paragraph (d) to read as follows:

§ 30.203 Emission Limits.

* * * * *

(d)(1) In addition to the limits noted above, for licensees operating mobile equipment in the 24.25-24.45 GHz or 24.75-25.25 GHz bands, the total radiated power of emissions in any 200 MHz of the 23.6-24.0 GHz band shall not exceed -33 dBW (for base stations) or -29 dBW (for mobile stations).

(2) For mobile equipment placed in service after September 1, 2027, the total radiated power of emissions in any 200 MHz of the 23.6-24.0 GHz band shall not exceed -39 dBW (for base stations) or -35 dBW (for mobile stations).

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